



## The Ambience Potential of Coloured Illuminations in Architecture

*A spatial experiment exploring bodily sensations*

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*Le potentiel de l'ambiance d'illuminations colorées dans l'architecture. Une expérience spatiale explorant les sensations corporelles*

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# The Ambience Potential of Coloured Illuminations in Architecture

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## Introduction

- 1 Since mankind learned to master fire and up until today's dynamic LED light, human ways of illuminating space have put their mark onto our physical environment and life (Garnert, 1993; Bille, 2013). Today's new lighting technologies have made their way into private homes, as well as public spaces, such as office and healthcare environments, where e.g. psychiatric clinics and maternity wards have integrated coloured illuminations as a supporting element for well-being, positioned in an overall growing aesthetic paradigm of healing architecture (Frandsen *et al.*, 2011; Heslet & Dirckinck-Holmfeld, 2008).
- 2 With the introduction and integration of coloured illuminations in our everyday lives, studies on their significance emerge. Up until now, these studies have predominantly been carried out in lab settings, quantitatively measuring relations between parameters of colour temperature and hormone levels, performance and/or mood (Ainsworth *et al.*, 1993; Öztürk *et al.*, 2012; Figueiro *et al.* 2018). Moreover, studies on light are traditionally based in the dominating belief that light is only to be perceived by the human body via vision. Therefore, figures of the human eye, explaining how light passes through the cornea to the retina, where photoreceptors (rods and cones) process information to the visual cortex at the back of the brain, are almost mandatory in traditional introductions to light and colour (Tregenza & Loe, 2014, p. 34–41; Valberg, 2005; Waldman, 2002).
- 3 In an attempt to inform and qualify these dominating approaches to the study of coloured illuminations on the human body, this article addresses a sensory exploration of the

ambience potential of coloured illuminations. Deriving from a phenomenological approach, the article takes into account the human body as a multisensory organism not only affected on hormone levels, performance and mood, but also on sensations of body and space, in an attempt to unfold a knowledge of the ambience potentials and applications of coloured illuminations as an essential design element in architecture. By this, the authors wish to investigate how human bodies are affected by colours of light as not exclusively visually seen but also felt. Therefore, we ask ourselves: How might we grasp and explore the overall ambience potential of coloured illuminations in relation to human bodily sensations in and of space?

## Architecture, Atmosphere and Bodily Sensation

- 4 In the context of architecture, we find an increasing interest in taking multi-sensorial elements into account for our experiencing of space, as well as for investigating such experiences' constitutions and implications. Architects have long been aware of atmosphere as a phenomenon of significance and potential within the(ir) built environment. Already in 1919, the Danish architect and ceramist Carl Petersen gave a lecture at The Royal Danish Academy of Fine Arts, School of Architecture on the textural effects of building materials in relation to human perception (Petersen, 1919). Later, in 1957, the Danish architect Steen Eiler Rasmussen published his observations on the matter in his book *Om at opleve arkitektur* (*Experiencing Architecture*). Although never using the notion of atmosphere for what he describes as human sensory interactions with the environment, we would include him in studies on atmosphere today. By this he was, in his own words, pushing to open up the minds of the reader to the music of the instrument that architecture plays (Rasmussen, 1957, p. 8). In the later years, we find architects, such as Peter Zumthor, who in his book *Atmospheres* (2006), addresses atmosphere as architectural quality, and Juhani Pallasmaa, who essentially argues for the importance of addressing human as a multisensory organism, in his book *The Eyes of the Skin* (2012) and additional publications (Pallasmaa, 2007, 2014).
- 5 A similar trend can be traced within the philosophical fields of phenomenology and aesthetics. Here, the concept of atmosphere has long been given attention, however it might be literally described in different terms. German philosopher Gernot Böhme, one of the most prominent contributors to the concept, characterises atmosphere as a general theory of perception, which recognizes how perception "is basically the manner in which one is bodily present for something or someone or one's bodily state in an environment" (Böhme, 1993, p. 125). More specifically, "things articulate their presence through qualities – conceived as ecstasies. [...] sensed in bodily presence by human beings and [...] this sensing is at the same time a bodily state of being of subjects in space." (*ibid.*, p. 122). This, the anthropologist Tim Ingold argues, bears similarities to what has been touched upon by other philosophers in the 20<sup>th</sup> century (Ingold, 2015a, p. 76). Of more interesting characteristics that can be seen as a forerunner for atmosphere, we find what the philosopher and literary critic Walter Benjamin (1936, 1968) called *aura*, something that when perceived is absorbed "into one's own bodily state of being. What is perceived is an indeterminate spatially extended quality of feeling." (Böhme, 1993, p. 117 f.). In summary, a history of the concept of atmosphere is laid out in details by philosopher Tonino Griffero through, among more, natural and urban landscapes, stage design, art and sensorial presences (Griffero, 2014, p. 55 and ff.).

- 6 Deriving from Böhme, in particular human bodily presence is an essential element of atmosphere. While atmosphere is about space as affective space, i.e. space that does something to the subject present in it, a notion of space as defined by geometric dimensions is abandoned. The geometric space is a space without body. It is potentially with bodies and bodily interactions, but as geometric, it has no atmosphere. Only when occupied with sensing bodies do we talk about atmospheres, and thus occupied, it is no longer a neutral space of specific dimensions measured in a quantitative form like a metric system; it becomes a qualitative space (Böhme, 2007). As such, human bodily sensation is positioned as a core element of architecture. A prominent contribution that to a great extent has informed the way architects and architecture might approach and take into account the human sensing body, is made by the Finnish architect Juhani Pallasmaa. For Pallasmaa, architecture should not only address the senses separately from a divided point of view, as too the dominance of vision. Moreover, Pallasmaa takes on a holistic multisensory approach to the human sensing body, joining the argumentation of phenomenologist Maurice Merleau-Ponty, when he states:

My perception is [therefore] not a sum of visual, tactile and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being. Which speaks to all my senses at once. (Pallasmaa, 2012, p. 23).

- 7 From this multisensory approach, Pallasmaa argues against the Western tradition of favouring the visual sense in architectural design and argues for the significance of the tactile sense for our experience and understanding of the world. Referring to anthropologist Ashley Montagu who relies on medical evidence, Pallasmaa writes;

[The skin] is the oldest and the most sensitive of our organs, our first medium of communication, and our most efficient protector [...] Even the transparent cornea of the eye is overlain by a layer of modified skin [...] Touch is the parent of our eyes, ears, nose, and mouth. It is the sense which became differentiated into others, a fact that seems to be recognized in the age-old evaluation of touch as 'the mother of the senses'. (Pallasmaa, 2012, p. 12)

- 8 Therefore, together Böhme and Pallasmaa teach us that we need our spatial designs to address human bodily sensations from a tactile multisensory point of view.

## Architecture, Atmosphere and Coloured Illumination

- 9 On the matter of light in architecture, it has always been recognized as an essential design element, drawing on the potentials of guiding daylight into buildings to meet functional and aesthetic needs. Although daylight, by tradition, has been related to the window opening, light has been connected to the intake of fresh air and the fact that direct sunlight is heating up the space and body (Heschong, 1979). Furthermore, coloured illumination in architecture has long been recognized as a strong tool to create different atmospheres and sensory experiences. As the painter of the stained-glass windows in Gaudi's La Sagrada Família, and former student of architecture, Joan Vila-Grau, states; "I have not tried to represent this scene [the Resurrection] figuratively, but rather to let the colours and the light be the elements that express the theme" (Vila-Grau, 2012, p. 3). From the glass mosaics of gothic churches to the coloured glass used in window compositions during the modern movement, for nearly a thousand years, coloured window glass has been used to support certain experiences and affects in and of architecture (Heuser, 2012; Moor, 2006).

- 10 Likewise, the connection between light, colour and sensory experience has been explored in artworks, such as the spatial constructions by James Turrell<sup>1</sup>, where compositions of coloured illuminations are challenging the viewer's depth perception, creating an illusion of wall barriers or contrasting the natural light. As Turrell puts it: "Light is a powerful substance [...] I like to work with it so that you feel it physically, so you feel the presence of light inhabiting a space." (Andrews, 2015, p. 19). Correspondingly, Olafur Eliasson too applies coloured light to challenge and create human bodily sensations in spatial contexts, as in his works *Your Atmospheric Cloud Atlas* (2009) at AROS in Aarhus (2011-2012) and *Room For One Colour* (1997) installed at the National Gallery in London (2017-2018) (Olafureliasson.net).
- 11 Today's new lighting technologies have expanded the application of coloured illuminations to not only churches and art installations, but also to the architecture of everyday life. However, despite the increasing application of coloured illuminations in architecture, its ambience potential is scarcely explored. While Böhme, in his earlier writings, focused primarily on light and shadow, not least for forming a space (Böhme, 2006, p. 91 and ff.; see also 1998, p. 35 and ff.), in later writings he also pays more attention to the colours of light:
- Compared to daylight, all other forms of lightness, i.e. coloured types of light that make things appear to us in different colorations, are regarded as mere illuminations. (Böhme, 2017, p. 200). [...] We see the coloration of the illumination as a tinting of the whole. What is involved here is a totality effect. The whole world or an entire scene is given a certain tint by the illumination. (*ibid.*, p. 202)
- 12 "Therefore", Böhme argues, "it is appropriate to say that illuminations are perceived as atmospheres." (Böhme, 2017, p. 203). In terms of the colour of the light, it is yet to be addressed and explored by theorists of atmosphere. From the origin of colour theory, we learn from the phenomenological studies of poet and scientist Johan Wolfgang Goethe, that: "762: Experience teaches us that particular colours excite particular states of feeling." (Goethe, 1970, p. 305). Contrary to the slightly anterior prominent colour scientist at the time, Isaac Newton, according to the Goethean theory, all colours lie between black and white, not on a scale of quantitative variation – that is of measurable wavelength – but on a *qualitative continuum of affective intensity*: of 'degrees of difference' rather than 'difference of degree' (Ingold, 2015b, p. 103).
- 13 Taking the notions of Böhme and Goethe into account, coloured illumination positions itself as a potential prominent design element in architecture. The fascination of the technological possibilities within lighting has created examples of extensive use of coloured light. Nevertheless, the newness of this technology and the intangibility of its ambient nature positions us as scarcely unaware of its effects on human bodily sensations in and of space. In his article *Atmosphere as Mindful Physical Presence in Space* for the *Oase* issue (edited by both Juhani Pallasmaa and Peter Zumthor), Böhme notes how the issue of mindful physical presence in architecture has once again become of interest for architecture today (Böhme, 2013). For even though technology has made possible for people to enter virtual realities, humans insist on their bodily existence, Böhme argues (Böhme, 2013, p. 21). Therefore, the need exists for further exploration of the affects of coloured illuminations and how they can be mindfully integrated in architectural contexts.

- 14 Within this flow and scope, an experiment was designed to further investigate the ambience potential of coloured illuminations in architecture, from an exploration of bodily sensations in and of spaces of coloured illuminations.

## Experimental protocol

- 15 Rooted in an anthropological methodology (Madden, 2010), the experimental design was based on the theoretical foundation of the outlined Böhmean concept of atmosphere, Pallasmaa's notion of touch and the hypothesis that 'particular colours excite particular states of feeling', deriving from Goethe. Moreover, having learned from architectural and philosophical phenomenology that the sensorial body lies at the core of both architectural and atmospheric experience, the experiment was centred on a spatial test exploring the sensorial effects of three different colours of illumination in space. The selected colours were chosen on the empirical basis of aesthetic applications of coloured illuminations in healthcare environments, that of red, blue and amber.
- 16 Referring to the designers Koskinen, Zimmerman, Binder, Redström and Wensveen (2011) and their concept of design research taking place in the field, the lab and the showroom, the spatial experiment was contextualized and situated in the context of an art installation, as a showroom. The testing was drawing on ethnographic methodologies usually carried out in the field and yet the experiment was organized in a controlled environment, as in a scientific lab. This way, the experimental protocol of the spatial experiment combined methodological directions in research from the lab, field and showroom referring to a lighting design research approach combining academic fields within natural science, social science and art (Hansen & Mullins, 2014).
- 17 Thus positioned within newer interpretations of where and how research can be carried out (Marcus, 2010; Niedderer & Roworth-Stokes, 2007), data were collected from applying sensory ethnographic methods and cultural probes, contextually and creatively designed to retrieve spoken and unspoken knowledge of human sensory experience (Dreyer & Norlyk, 2013; Gaver, Dunne, & Pacenti, 1999; Pink, 2015). By this, the experiment was too a methodological exploration of what happens, when we mix explorations of art, architecture and anthropology into a transdisciplinary approach, to reveal the unknown and potentially unexpected (ambience potential of coloured illuminations).

## Context of Experiment

- 18 The experiment was carried out in the context of the performance art installation "Sisters Academy – The Boarding School", over a two-week period in October 2017 at Den Frie Centre of Contemporary Art in Copenhagen (cf. Figure 1).
- 19 The installation was performed by the Copenhagen-based performance-group and movement Sisters Hope, an associated international troupe of performers, which operate at the intersection of performance art, pedagogy, activism and research. Mainly, the performance-group argues the need for an aesthetic dimension to be an integrated part of everyday life. In relation to this quest, the group carries out the performance-experiment and movement; Sisters Academy, as a school in a world and society where the sensuous and poetic mode of being is at the centre of all action and interaction (Rikke Luna & Matias *et al.*, 2017, p. 8; Sistersacademy.dk).

Figure 1: Visualizations of Sisters Academy – The Boarding School



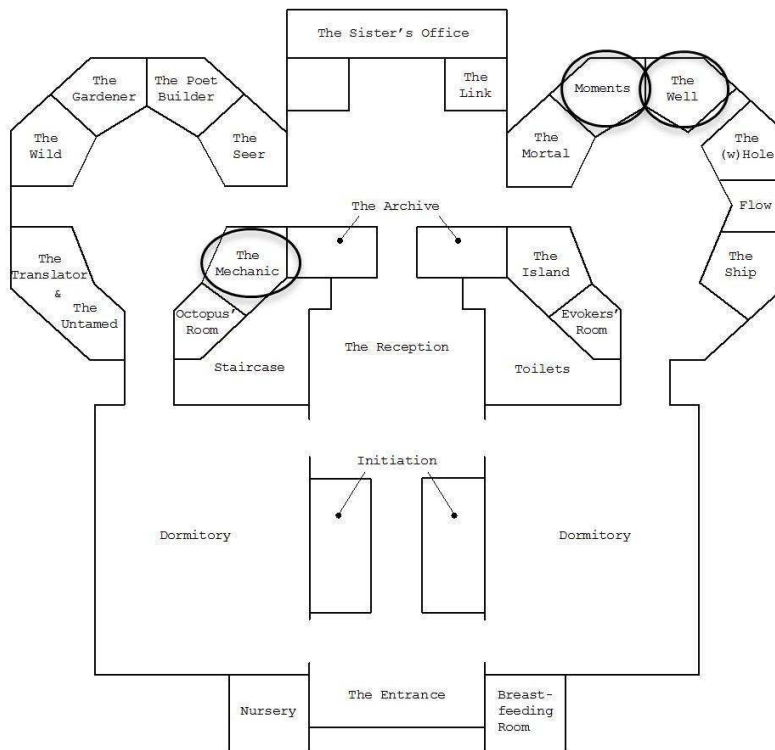
© DIANA LINDHARDT

- 20 During the manifestation, all performers lived in the installation 24/7 as staff members of the boarding school. The only way the public could enter the installation was by enrolling as students for a minimum of twenty-four hours, which included taking classes and sleeping in a dormitory. Prior to enrolling, the students had all signed an acceptance letter, agreeing to be part of the laboratory of Sisters Academy and research. During their stay, students at the school were presented with an alternative world where everything was based on the principles of aesthetics and sensuality. This also influenced teaching at the school, which took the overall shape of an aesthetic laboratory experimenting with poetic attentiveness and sensuous learning (Rikke Luna & Matias *et al.*, 2017, p. 7, 20-21).
- 21 Situated in this performative laboratory context, the researcher (and first author of this article) manifested as a visiting staff member in the poetic self of The Aura. During the days of teaching, the researcher carried out classes on sensory experiences of coloured illuminations in the performance art installation – that being the experiment.

## Spatial and Material Setting of the Experiment

- 22 Students were assigned to the class/experiment in a random order, depending on the overall administration of classes and potential wishes of the students. After being assigned to the class, the students would meet The Aura in her laboratory setting, located in a white room (the tableau of Moments) or a black room (the tableau of The Well (1) or The Mechanic (2)) (see Figure 2 for the location of the three rooms in the performance art installation).



**Figure 2: Upper floor plan of Sisters Academy – The Boarding School**

Source: Rikke Luna & Matias *et al.*, 2017, p. 30

- 23 All three rooms were of approximately six square meters of solid walls and roof, with no entering of daylight. Furthermore, the surfaces of the spaces were painted wooden walls (in the white room some places covered with transparent white tull fabric) making it possible for the light to be transmitted throughout all three spaces, by a high degree of ambient luminescence (Kelly, 1952, p. 25).
- 24 During the experiment, all lights where turned off in the tableaus only to be lit up by a portable EVA LED light source being 30 centimetres in diameter and controlled by a remote control (cf. Figure 3).

**Figure 3: The EVA LED light source in hues; Red, blue and amber (shown here in 20, 30 and 40 cm diameter)**

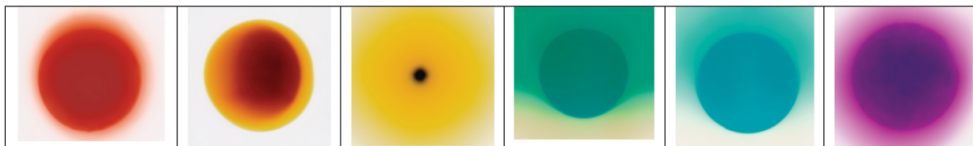
© STINE LOURING NIELSEN

- 25 The light source was made of white thermoplastic (polyethylene) by international standards (IP54) for dust and water protection. Additionally, it consisted of 12 x RGB, 0,18W per RGB. Being the only active source of light during the experiment, it allowed for the generation of a colour-saturated illuminated space.

## Procedure of Experiment

- 26 The duration of the experiment was between 45 minutes and 2 hours, depending on the level of immersion and reflection of the participants. Participants were both male and female, ranging from 16 to 73 years old, primarily between 20 and 30 years old. The experiment was performed with attendance of one (13%) up to three (32%) participants at a time, however mainly two (55 %) (cf. Table 2).
- 27 With the purpose of acclimatizing and aligning a common baseline, the participants were first led through a short mediation, during which they were asked to reflect on the colours of their outer and inner surroundings through phrases like “Visualize your dreams from last night, picture their colours, their brightness or dimness” and “Today during the morning, when you opened your eyes, what was the colour of the room where you woke up”.
- 28 After the meditation, the participants were asked to pick a colour-card from a deck of six cards, which they felt mostly drawn to. Applied as an additional element of acclimatization and a potential method for screening and categorization of participants, the cards were chosen in relation to Goethe’s six primary colours: red, orange, yellow, green, blue and purple. The underlying hypothesis was that if each colour excites particular states of feeling, as Goethe argues, they might also reflect a particular state of character within the participant who picked the card. As a further exploration of methods and to further challenge the assumption that colours might be possible to sense through the skin, each card was facing down, all to reveal a photograph of different radiations of the sun when turned (cf. Figure 4).

**Figure 4: The colour-cards**



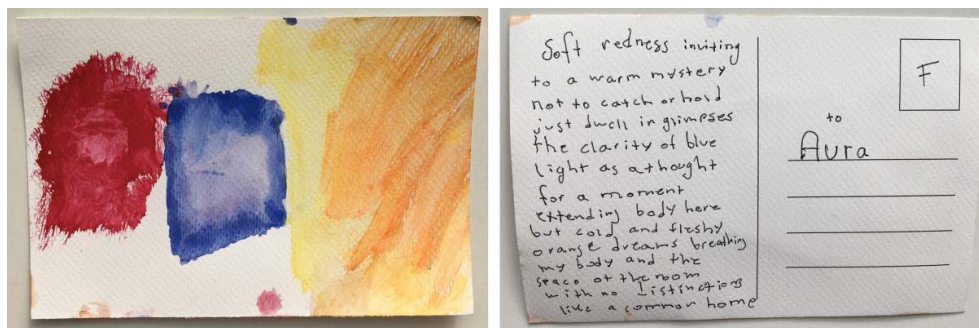
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- 29 Each of the participants was then given an anonymizing identification letter (A-Å) and the colour of their card was written down. The participants were asked to lie down on their backs and put on a blindfold for the experiment. The LED light bowl was turned on in one of three different hues: red, blue or amber. As shown in Table 2, the order of when each hue was turned on followed an overall uneven and skewed pattern to first track potential patterns in data, and then test to which extent they were independent the order of projection. Consequently, the first 43 participants and the last one were exposed to the order: red - blue - amber. Additionally, two participants were exposed to the order: blue - amber - red. Six were exposed to: amber - blue - red and three to: blue - red - amber.
- 30 During the projections of the different hues of ambient illumination the participants were interviewed on their bodily sensation in and perception of space (cf. Table 1).

**Table 1: The interview guide (repeated for each of the three light settings)**

<p><i>(Blindfolded)</i></p> <p><i>While lying here I want you to keep your awareness on your bodily sensation...</i></p> <p><i>How would you describe your bodily sensation?</i></p> <p><i>Your bloodstream?</i></p> <p><i>Heart rate?</i></p> <p><i>Breathing?</i></p> <p><i>Skin?</i></p> <p><i>How would you describe the space that you are in?</i></p> <p><i>Where are you placed?</i></p> <p><i>And how?</i></p> <p><i>How do you move in this space?</i></p> <p><i>What does it make you think of?</i></p> <p><i>How would you describe the interaction between the space and your body?</i></p> <p><i>(Blindfold off)</i></p> <p><i>Is there any change in your bodily sensation?</i></p> <p><i>Is there any change in your perception of space?</i></p>
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- 31 All interviews were carried out by the questions and structure seen in the interview guide above. Depending on the participants' reflections and sensations, they were asked additional questions for further elaboration. During each of the light settings, the participants would first experience the coloured illuminations blindfolded and then be asked to take of the blindfold to state if they noticed any change in their bodily sensation or perception of space. This procedure was carried out before going to the next light setting, repeating the procedure for each hue.
- 32 During the interview, the researcher transcribed the statements of the participants in real-time while also recording them on a dictaphone (Olympus WS-450S Digital Voice Recorder) for later alignment and reduction of potential bias.
- 33 After being interviewed in all three light settings, both blindfolded and with open eyes, the participants were asked to paint their experience on a postcard, either of one or all the different light settings. On the back of the postcard, they were additionally asked to write down some keywords or a poetic description in relation to their drawing/experience (cf. Figure 5).

**Figure 5: Postcard of Participant F (Photo 1: Front – Photo 2: Back)**

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- 34 At the end, the identification letter of the participants was noted on the respective postcards in the top right corner. When the 14 days of data collection came to an end, the postcards and the handwritten transcriptions of the interviews were donated to the open access archive of Sisters Academy, which is in the process of being digitalized.

## Processing of data

- 35 By the end of data collection, the experiment counted transcriptions of 55 participant interviews and 60 postcards in total. Interview data were organized in the parameters; ID letter, Gender, Colour card, Room, Order of hue and Number of participants during each session (cf. Table 2).

**Table 2: Overall coding of interview data**

ID	Gender	Card	Room	Order of hue	Number of participants
A	F	Green	White	R-B-A	1
B	F	Red	White	R-B-A	2
C	F	Green	White	R-B-A	2
D	F	Red	White	R-B-A	2
E	F	Blue	White	R-B-A	2
F	M	Red	White	R-B-A	1
G	M	Orange	White	R-B-A	2
H	M	Red	White	R-B-A	2
I	F	Orange	White	R-B-A	1
J	F	Red	White	R-B-A	1
K	F	Blue	White	R-B-A	3
L	F	Orange	White	R-B-A	3
M	F	Green	White	R-B-A	3
N	M	Orange	White	R-B-A	1
O	M	Yellow	Black (1)	R-B-A	2
P	F	Green	Black (1)	R-B-A	2
Q	F	Yellow	Black (1)	R-B-A	2
R	F	Green	Black (1)	R-B-A	2

S	F	Yellow	Black (1)	R-B-A	2
T	F	Purple	Black (1)	R-B-A	2
U	F	Red	White	R-B-A	2
V	F	Blue	White	R-B-A	2
X	F	Orange	Black (2)	R-B-A	2
Y	F	Blue	Black (2)	R-B-A	2
Z	F	Red	White	R-B-A	3
Æ	F	Purple	White	R-B-A	3
Ø	F	Blue	White	R-B-A	3
Å	F	Purple	Black (1)	R-B-A	2
AA	F	Purple	Black (1)	R-B-A	2
BB	F	Yellow	Black (1)	R-B-A	2
CC	F	Blue	Black (1)	R-B-A	2
DD	F	Green	Black (1)	R-B-A	2
EE	F	Red	Black (1)	R-B-A	2
FF	F	Yellow	Black (2)	R-B-A	2
GG	F	Blue	Black (2)	R-B-A	2
HH	F	Red	Black (2)	R-B-A	2
II	F	Purple	Black (2)	R-B-A	2
JJ	F	Yellow	Black (2)	R-B-A	3
KK	F	Orange	Black (2)	R-B-A	3
LL	F	Blue	Black (2)	R-B-A	3
MM	F	Blue	Black (2)	R-B-A	3
NN	F	Blue	Black (2)	R-B-A	3
OO	F	Blue	Black (2)	R-B-A	3
PP	F	Green	Black (1)	B-A-R	2
QQ	F	Orange	Black (1)	B-A-R	2

RR	F	Green	Black (1)	A-B-R	1
SS	F	Purple	Black (1)	A-B-R	2
TT	F	Yellow	Black (1)	A-B-R	2
UU	F	Purple	Black (1)	A-B-R	3
VV	F	Yellow	Black (1)	A-B-R	3
XX	F	Orange	Black (1)	A-B-R	3
YY	F	Green	Black (1)	B-R-A	3
ZZ	F	Red	Black (1)	B-R-A	3
ÆÆ	F	Orange	Black (1)	B-R-A	3
ØØ	F	Blue	White	R-B-A	1

- 36 The transcriptions of the interviews were informed by the audio recordings and afterwards coded, following three analytical topics of ‘bodily sensation’, ‘perception of space’ and ‘sensation of touch’ extracted from the theoretical framework of the experiment. Subsequently, patterns and links were identified between the oral and painted descriptions of the participants, following an analytical process of what visual anthropologist and filmmaker Jakob Høgel has described as “weaving a basket of data” (Høgel, 2013), and anthropologist, Anthony Cohen, as discovering “the figure of the carpet”. “Observation, to be of value”, Cohen refers, “must lead to insight, the noticing of apparently insignificant points, the making of connections, the discovery of what Henry James called ‘the figure of the carpet’.” (Cohen, 1984, p. 220).

## Findings

- 37 The overall findings of the analysis generally showed no difference in the participants’ bodily sensation and perception of space in the different hues of illumination in relation to being blindfolded or not. Neither was any connection identified between the bodily sensations and perceptions of space stated by the participants and their spatial context of either being located in the black room 1 or 2 (64 %) or the white room (36 %). Nor did this data show any effects in relation to the number of participants (1-3) carrying out the experiment. This meant that both participants carrying out the experiment alone (7) or together with one (15) or two (6) other participants expressed similar experiences of bodily sensation and perception of space during the experiment.
- 38 Furthermore, no significant differences between the participants’ bodily sensation and perception of space were found in relation to gender. However, the skewing of the gender distribution between the participants (5 male vs. 50 female) makes it hard to draw any valid conclusions on this matter, and should be seen in light of the overall gender distribution among students at Sisters Academy – The Boarding School.

- 39 Moreover, no link was identified between the specific colour of the selected colour-cards, and the stated sensations of the participants. Therefore, the selection of the six cards were somewhat equal, all selected between 12 (Blue) to 7 (Purple) times – 9 times on average (cf. Table 2). Accordingly, even though the drawing of the colour-cards might have added a positive element of acclimation, it proved to be an unsuitable method for screening and categorization of participants, in relation to the overall parameters of the experiment. However, participants generally expressed to have drawn the colour that they were imagining during the colour-mediation and/or that they usually identified themselves by or categorized as their “favourite”.
- 40 The most emphasized patterns and links of the interview- and drawing data on participants’ general sensory experiences were identified within the three analytical themes of ‘bodily sensation’, ‘perception of space’ and ‘sensation of touch’ in relation to the different hues of illumination: red, blue and amber – As shown in the following three paragraphs of analysis. Despite the uneven and skewed order of exposure of hues, it is evident to note, that the “figures of the carpet” did not limit themselves to experiment sessions of the same order of hues.

## Red Illumination

- 41 Participants generally experienced their *bodily sensation* as warm and heavy, when being bodily present in the space of red illumination. As described in the quotes of Participants PP and ØØ below, a common notion was for the participants to feel shielded and grounded or pressed down to the floor, while sensing an uneasy feeling of claustrophobia or not being able to move.
- This is very different from before... this is like I want to get out but I am not able to... It is not friendly at all... It is like something is keeping me back... I feel like a stone or a rock... but it is not about roots, which is good... This is not good... I am stuck. (Participant PP)
- In a way I still just feel safe... It is like being in a hollow mood<sup>2</sup> and also the feeling of not being alone... Because there is someone on top of you... But it is maybe also a bit claustrophobic. (Participant ØØ)
- 42 In relation to their *perception of space*, a general sensation was that of being in a soft enclosed cave or womb, as illustrated and noted in the postcard of Participant G (see Figure 6).

Figure 6: Postcard of Participant G (Photo 1: Front – Photo 2: Back)



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- 43 Following the womb analogy, the sensation of the space was generally warm, thick and soft, and to some a bit mysterious, as described by Participant HH; “It is a little bit like being in a magic box... Like in a wizard’s home... Where I don’t really know the rules...”.
- 44 Moreover, a general *sensation of touch* for the participants was that the space was trying to enter their skin. As such, the space was sensed as active and a bit annoying or intrusive, like it was coming towards them, as illustrated by Participant B and MM (see Figure 7).

Figure 7: Postcard of Participant B and Participant MM (Photo 1: B – Photo 2: MM)

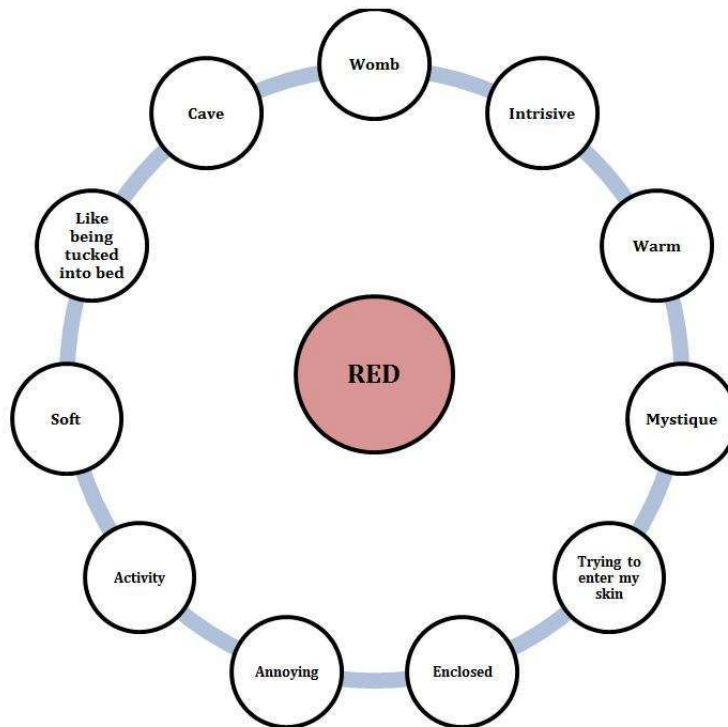


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- 45 The common patterns identified in data from both interviews and postcards on participants’ bodily sensations of being in a red illuminated space, are summoned up by Table 3 seen below.



Table 3: Chart of patterns in participants' bodily sensations of being in a red illuminated space



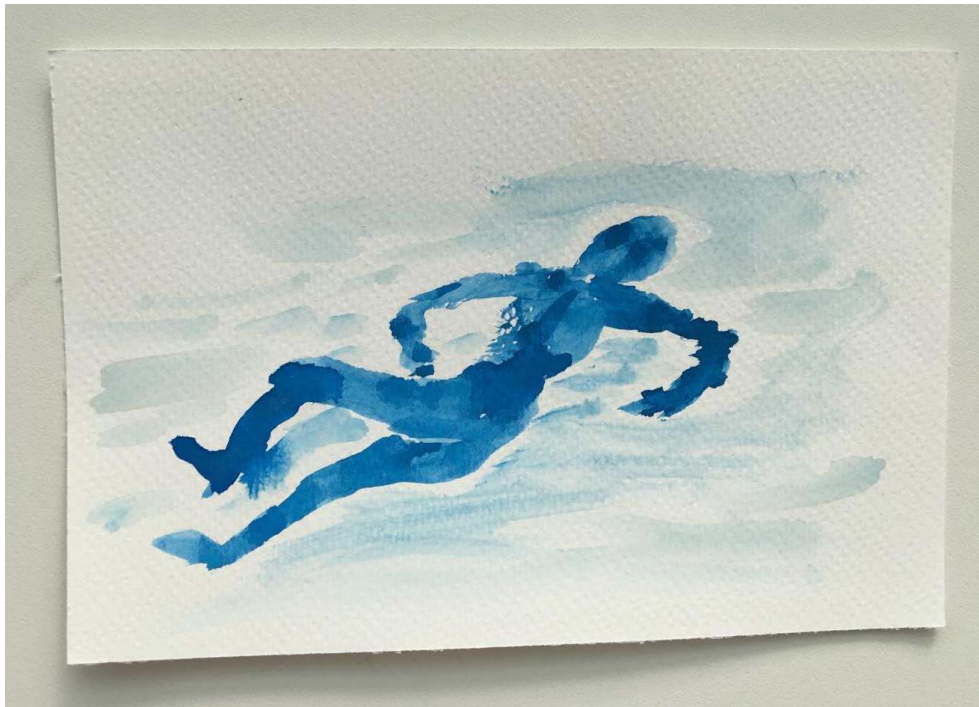
## Blue Illumination

- 46 Participants generally experienced their *bodily sensation* as cold and floating, when being present in the space of blue illumination. As described in the quotes of Participants ØØ and UU and illustrated in the postcard of Participant P below (see Figure 8), a common notion was for the participants to feel like hiding or being in deep water or floating in space.

(Q: Do you know a space like this?) Yes... Inside myself... It is melancholic and heavy... (Q: How do you move in this space?) I don't... I just feel like hiding... But there is also a sort of calmness to it... [...] It is not earth or air... It is more like water... Like being in deep water... Where maybe also the dark feelings are hiding... (Participant ØØ)

It feels more like a spaceship... That the ship is floating in space... It was more stable before... (Participant UU)

Figure 8: Postcard of Participant P (Front)



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- 47 In relation to the participants' *perception of space*, a general sensation was that of being in a big and cold space with changing or no limits, which for some participants lead to a sensation of their body being "alone in a weird way", as illustrated by Participant G (see Figure 9) and an interview quotation from Participant ZZ;

I think it is colder and now I notice the wind from the door... I did not do that before... I feel that it is a big space... Like I cannot sense the ceiling and walls... I think the space is distant... It is uncomfortable... I feel like my body is alone in a weird way... Like it needs some kind of surrounding in a way... (Participant ZZ)

Figure 9: Postcard of Participant G (Photo 1: Front – Photo 2: Back)



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- 48 In relation to the bodily sensation of floating in a space with no limits, a general *sensation of touch* for the participants was of the space being on the surface of their skin. As such, the space was sensed as passive and distant, like the universe, an elevator space or a space "inside myself", as Participant ØØ described it above. Different from the red

illumination, participants felt more like floating than enclosed, as illustrated by Participant II (see Figure 10).

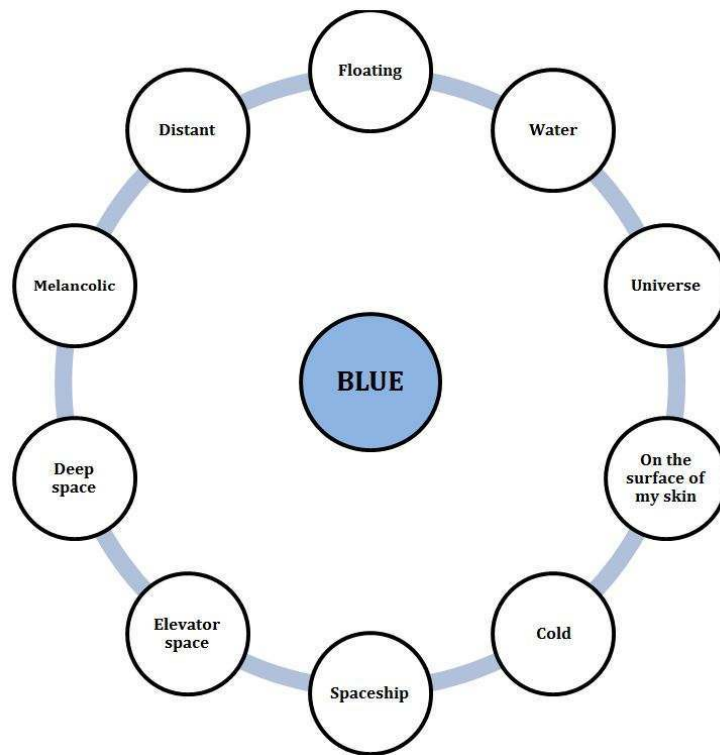
**Figure 10: Postcard of Participant II (Front)**



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- 49 The common patterns identified in data from both interviews and postcards on the participants' bodily sensations of being in a blue illuminated space, are summoned up by Table 4 seen below.

Table 4: Chart of patterns in participants' bodily sensations of being in a blue illuminated space



## Amber Illumination

- 50 Participants generally experienced their *bodily sensation* as calm, natural and happy, when being present in the space of amber illumination. As described in the quotes of Participant UU and EE and illustrated in the postcard of Participant S below (see Figure 11), a common notion was for the participants to feel like being carried, well protected and safe.

It feels like an onion and that I am in the middle of it... Well protected... It is both soft and hard... (Participant UU)

... Like maybe someone is carrying you... Like a mother carrying you... It feels heavy and safe, like there is something all the way around you... Like you are protected (Participant EE)



Figure 11: Postcard of Participant S (Front)



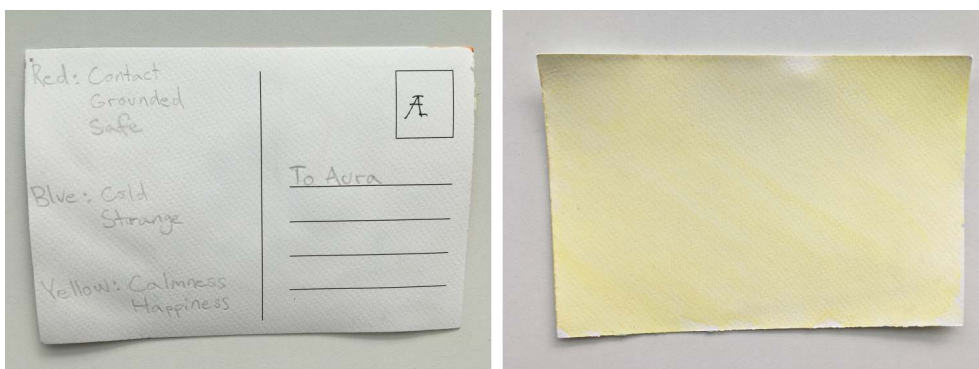
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- 51 In relation to the participants' perception of space, a general sensation was that of belonging and being centred in a neutral and caressing space;

It feels like I belong to this space... It is very natural... Very simple... Like with no doubt... Centred... (Participant HH)

It is definitely thinner and lighter... I have no idea why but it feels like spring... Like a new beginning... Like life is coming back and love is in the air [...] It is definitely a good energy... Very vibrating... And more light and cheerful (Participant ØØ)

Figure 12: Postcard of Participant Æ and Participant A



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- 52 In relation to the participants' bodily sensation of belonging to the space of amber illumination, their general *sensation of touch* was of the space following their body and entering their skin in a very subtle way;

It feels softer now... Like one of those pillows that forms itself when you lie in it... It follows your body... It is more gentle... Like dancing with me... (Participant NN)  
 It feels like it is entering... Not stopping at the surface but just kind of floating in. (Participant EE)

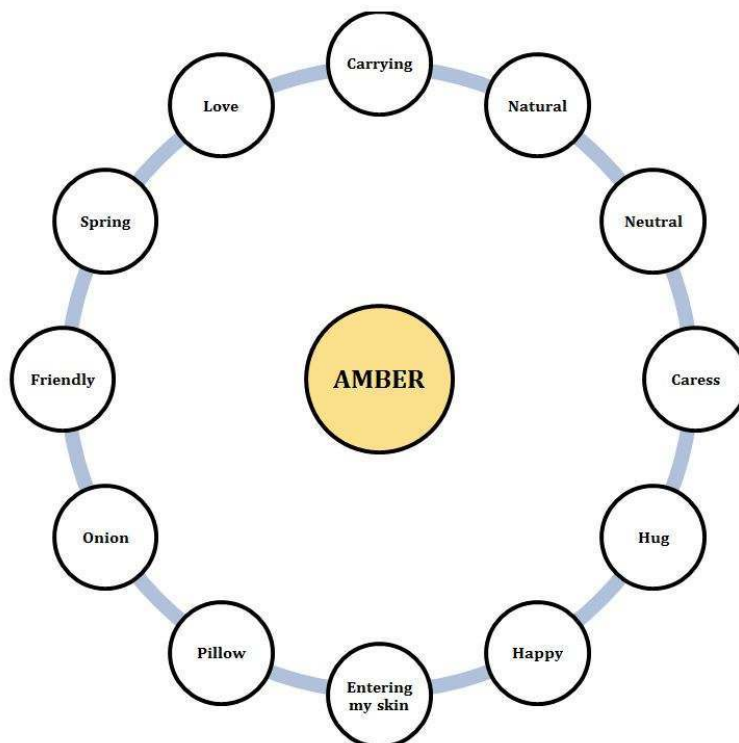
**Figure 13: Postcard of Participant AA and Participant G**



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- 53 The common patterns identified in data from both interviews and postcards on the participants' bodily sensations of being in an amber illuminated space, are summoned up by Table 5 seen below.

**Table 5: Chart of patterns in participants' bodily sensations of being in an amber illuminated space**



## Discussion

54 Beginning our inquiry, we asked ourselves: how might we grasp and explore the overall ambience potential of coloured illuminations in relation to human bodily sensations in and of space? Deriving from a multisensory approach informed by phenomenological theories of atmosphere and colour theory, we sat off without knowing what to find. During the experimentation and analysis of data, it thus became evident that the potential of coloured illuminations seems to go beyond the notion of vision and quantitative measurements and understandings of space. Informed by our findings on a purer sense of body and space, we found that human bodily sensations and perceptions of space are expressively affected by colours of illumination. The question is now how we might apprehend these findings for a further understanding of the ambience potential of coloured illuminations in architectural spaces.

### *Touching Coloured Illuminated Space*

55 As stated in the introduction of this article, our characterisation of experiencing architectural space is largely dominated by vision and quantitative standards. By our experiment, we questioned if this is doing justice to our experience, which is also what is questioned with the concept of atmosphere as “a general theory of perception” (Böhme, 1993, p. 125). Preceding the perception of the room, we may find a sensorial and bodily reaction to it, a sensory experience [*Erlebnis*], which forms our relation to it.

56 Feeling is not an approach widely recognised today; we expect at least a visual characterisation, which, in contemporary culture, we give priority to over the other senses. A priority to vision has a history of its own. We read in Aristotle that vision tells us much about differences between things (Aristotle, *Metaphysica*, 980a26), and we can think of many metaphors linking knowledge and vision. On the other hand, we should be careful here: it may well be that sight had to gain its contemporary position through modern culture (Pallasmaa, 2012, p. 25) and this process imply such simple matters as the change in lighting conditions – with a modern culture, we get better artificial lighting, enabling us to free ourselves from rhythms of nature and reformulate many activities now to be performed in hours not possible before, as well as indoor (Classens, 2012). Despite vision giving us much information, it is not necessarily to be trusted, and baroque architecture will give us many examples of fragments, distorted perspective, *trompe-l'œil* and illusions. Does vision play the key-role for giving us knowledge touch is the fundamental sense for an organism to be alive (Aristotle, *De Anima*, 434b). Vision and the three other senses, are for our well-being; touch is simply for ensuring our being (*ibid.*, 435b). It is then more than a coincidence that when Descartes writes on optics and vision he does it based on touch (Merleau-Ponty, 1964, p. 37; see also Pallasmaa, 2012, p. 22).

57 Therefore, giving priority to vision today may imply pushing aside or even ignoring significant sensorial reactions although we are still subject to these other sensations. But what the experiment here indicates is that multi-sensorial is more than paying attention to more senses at a time; it may be to pay attention to how more senses are at work at the same time, informing an integrated bodily sensation. While touch may be problematic to use as it implies a physical contact of something it does relate to how participants express what they experience: a relation to the space through their skin – of something touching

and even passing through their skin. Again, the focus is on sensory experience and not on actual physical events, and when deprived of sight an outcome may actually be that it is replaced by a more vivid imagination of the visible. How we react to architectural space and concrete to coloured light in it may prove to be a complex of sensuous impressions that need investigations through a line of different sensorial approaches.

- 58 Consequently, our findings emphasise that within an architectural context of creating spaces for human beings, it is important to consider that architectural spaces speak to all human senses at once, and not only through the sense of vision. Furthermore, our findings stress how non-visual effects of coloured illuminations are not limited to concern e.g. physiological aspects of human circadian rhythms or psychological aspects of mood but also aspects of affects on human sensations of body and space. By acknowledging an extended understanding of the bodily affects of illuminated spaces and coloured illuminations as an essential design element in architecture, architects will be able to transfer and apply its ambience potential to different architectural contexts and compositions of spaces, materials and textures, to support and emphasize different human bodily sensations and architectural intentions. Therefore, considering the present state of the art, and acknowledging the sensory body as a measure for architectural quality, we stress the need to further address and investigate that “the spatial shape of architecture is not merely a matter of what you see, but is rather experienced in an by the body, as if it were realized internally.” (Böhme, 2013, p. 21).

## Conclusion

- 59 The overall idea behind this research was a deliberate testing of the ambience potential of coloured illumination on human bodily sensations and perceptions of space, with the purpose of informing quantitative measurements and understandings of illuminated space, while challenging the significance of vision on the matter.
- 60 Despite variations between participants, it was possible to identify some similarities. The experiment showed that participants sensed their body and perceived the space around them in a comparatively similar manner in relation to the specific colour of illumination – from the warm grounding womb of the red illuminated space, to the floating cold elevator space of the blue and the centring caress of an onion in the amber. This being independent of whether the participants were blindfolded or not.
- 61 Hence, the findings from the experiment indicate that coloured illumination is not merely a design element of visual effects, but also one of ability to influence human bodily sensations in and perception of space. Addressing the significance of bodily sensations, designs of coloured illumination have the potential to move and affect human bodily presence, and thus human experiences of and in architectural spaces, attuning the life, nature and ambience of architectural spaces. In this manner, the findings of the experiment point out the importance of acknowledging and integrating the ambience potential of coloured illuminations as an essential design element in architecture. Stressing a multisensory attention to touch not limited to vision in architecture, this study argues for further studies on the ambience potential of coloured illuminations in everyday architecture, such as homes and healthcare environments.

### **Acknowledgements**

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## NOTES

1. E.g. Luther's Light, installed in Berlin (2017-2018) and Skyspace, e.g. installed in Ekebergparken, Oslo 2013.
2. "Hollow mood" has been translated from the Danish word "hulestemning".

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## ABSTRACTS

This article presents the results of a spatial experiment, which investigates the ambience potential of coloured illuminations in architecture. The experiment took place over a period of two weeks, situated in a semi-laboratory setting of a performance art installation. Qualitative methods inspired by sensory ethnography and cultural probes were applied to grasp the fullness and originality of human bodily sensations of coloured illumination by exploring its effects on participants' perception of body-space interaction. During the days of experimentation participants were interviewed on their bodily sensation in and perception of a space, while being blindfolded and exposed to three different hues of illumination; red, blue and amber. Findings from the experiment showed how participants sensed their bodies and perceived the space around them in a comparatively different manner in relation to the different hues of illumination, independently of being blindfolded or not. By this, the article contributes to spatial innovation in the light of feelings and sensations of ambience, informing a new multisensory understanding of how coloured illumination can affect bodily sensations and perceptions of space, and argues for a general mindful integration of coloured illuminations in architecture as an essential design element.

L'article expose les résultats d'une expérience spatiale examinant le potentiel de l'ambiance d'illuminations colorées dans l'architecture. L'expérience s'est déroulée sur deux semaines dans un contexte de semi-laboratoire sous forme d'une installation de type performance artistique. L'approche méthodologique qualitative est inspirée par l'ethnographie sensorielle et les sondes culturelles. Ces méthodes ont permis d'explorer les effets des illuminations colorées sur l'expérience du corps et de l'espace des participants pour ainsi saisir pleinement l'originalité des sentiments corporels humains liées aux illuminations colorées. Les participants ont été interviewés sur leurs sensations corporelles et leur perception de l'espace pendant l'expérience en portant un bandeau sur les yeux et exposés à trois différentes teintes de couleurs ; rouge, bleu et ambre. Les résultats de l'expérience montrent que les participants, yeux bandés ou non, ont ressenti leurs corps et ont perçu l'espace autour d'eux de façon relativement différente selon les couleurs d'éclairement. L'article contribue donc à l'innovation spatiale considérée à la lumière de sensations et d'émotions de l'ambiance façonnant ainsi une nouvelle compréhension multisensorielle de la manière dont les illuminations de couleurs peuvent affecter les expériences sensibles du corps et de l'espace. Les auteurs recommandent une intégration consciente des illuminations de couleurs comme élément essentiel de design dans l'architecture.

## INDEX

**Mots-clés:** architecture, ambiance, illumination, couleur, sensation corporelle, touché

**Keywords:** architecture, atmosphere, illumination, colour, bodily sensation, touch

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